

VIRGINIA DEPARTMENT OF TRANSPORTATION

TRAFFIC ENGINEERING DIVISION

MAINTENANCE DIVISION

INSTRUCTIONAL & INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: Pavement Shoulder Wedge		NUMBER: IIM-TE-391 IIM-MD-002.1
		SUPERSEDES: IIM-MD-002 dated Dated May 1, 2014
SPECIFIC SUBJECT: Providing pavement shoulder wedge with asphalt paving		DATE: February 5, 2020
		SUNSET DATE: None
APPROVAL: <div style="text-align: center;"> /original signed by/ Raymond J. Khoury, P.E. State Traffic Engineer Richmond, VA 02/05/2020 Raymond J. Khoury, P.E. State Traffic Engineer </div>	APPROVAL: <div style="text-align: center;"> /original signed by/ Branco Vlacich, P.E. State Maintenance Manager Richmond, VA 02/05/2020 Branco Vlacich State Maintenance Manager </div>	

Effective Date:

This Memorandum is effective upon issuance with the intent that pavement shoulder wedge shall be installed, per this guidance, beginning with projects that begin construction after January 1, 2020.

This Memorandum may also be applied to projects that were under construction prior to January 1, 2020 if the Project Engineer approves the change.

This Memorandum shall be effective for all land use permits where the first draft/preliminary submission has not yet been submitted to VDOT as of the signature date, and may also be applied to permit work currently under VDOT review if feasible to do so. This Memorandum may also be applied to previously-approved permits if mutually agreed to by VDOT and the permittee.

Requests for exceptions or deviations from this policy during the design phase shall be directed to the District Traffic Engineer who will approve or deny the request for exception or deviation

based on the specific characteristics of the project or location. Approved project exceptions or deviations shall be documented in the project file.

Background:

Providing a pavement shoulder wedge enables drivers who drift off the paved roadway surface to return to the road safely. Rather than a vertical pavement edge drop-off, the wedge provides a sloped surface at the edge of pavement, providing a strong, durable transition for vehicles. Studies have shown that the wedge can reduce run off road and opposite direction crashes by 20%. The pavement shoulder wedge also provides a means of strengthening and stabilizing the pavement edge to aid in reducing maintenance costs and enhances longer-term pavement edge performance.

Additional information is available at:

<https://safety.fhwa.dot.gov/safetyEdge/>, and

https://www.fhwa.dot.gov/innovation/everydaycounts/edc-1/pdf/safety_edge_techbrief.pdf.

When and Where to Use:

Pavement shoulder wedge shall be used when placing asphalt concrete pavement surfaces on all new construction and maintenance projects and permit work that mill and/or pave to the edge of pavement (including Mill-and-fill, and straight overlay) and that meet the conditions of this section.

For mill-and-fill and resurfacing/overlay project contract development, the District Traffic Engineer should work with the District Maintenance Engineer and District Pavement Manager to identify pavement shoulder wedge locations and quantities to include in the contracts.

Pavement shoulder wedge shall be installed on roadway segments where all of the following conditions are met:

- Open ditch sections (no curb and gutter)
- Paved Shoulder Widths 4 feet wide or less
- Speed limits greater than 35 mph
- Specified Final asphalt surface lift thickness greater than or equal to 1.25 inches

Pavement shoulder wedge shall be installed on other roadways where shoulder wedging could improve roadway safety or the condition of the pavement edge as directed by the Engineer.

The contractor shall stop installation of the shoulder wedge in specific roadway segment locations where any of the following field conditions are present, and resume installation after passing these locations:

- Driveways, intersections, interchanges, or bridges.
- Ditch slope begins within one foot from the edge of pavement or less than one foot of unpaved shoulder exists, if wedge is placed on unpaved shoulder as shown in Figures 3 and 4.
- Guardrail exists and the face of guardrail is within 3 feet from the existing edge of pavement.

Cross Sections:

Pavement shoulder wedge can be placed on top of the existing pavement (as shown on Figures 1 and 2), as well as over unpaved shoulder (as shown on Figures 3 and 4). **Priority should be given to placing the wedge over the unpaved shoulder (Figures 3 and 4) because this method maximizes the depth of roadway pavement that will be protected by the wedge in**

low/rutted shoulder conditions and also does not reduce the surface travel width of the roadway. This is especially important on road segments that have a history of shoulder rutting or that have narrow travel lanes and/or paved shoulders. When the pavement shoulder wedge is placed over unpaved shoulder (Figures 3 and 4), it is critical to construct the wedge so the point where the downward wedge slope begins is placed over/just inside the existing edge of the pavement structure. If the wedge is placed such that the slope begins outside of the existing pavement structure, there is greater risk that the wedge will crack or break off. Placing the wedge so that it begins over/just inside the edge of the pavement minimizes this risk.

Shoulder Preparation:

High Shoulder Build-up Condition - Shoulder preparation is required when there is an existing high shoulder build-up condition at the edge of pavement for both overlay and mill and fill paving projects. At high-shoulder locations, the shoulder must be prepared to accept the pavement wedge and aggregate/shoulder material graded to the existing shoulder by removing the soil build up and vegetation within one foot from the edge of pavement (as shown in Figures 2 and 4) prior to placing the asphalt shoulder wedge. There is a pay item, described below, for this preparation work. Shoulder preparation is not required on projects that involve grading and construction of the entire roadway cross section. Material removed from the high shoulder should be disposed of offsite or used elsewhere in the project per the contract requirements.

Low / Rutted shoulder Condition – Shoulder preparation is not required in areas where the shoulder is low or rutted at the edge of pavement (as shown exaggerated in Figures 1 and 3). In low shoulder locations with the wedge outside of the existing pavement as in Figure 3, the asphalt will fill the low shoulder area when the wedge is installed. Aggregate shoulder material shall be placed to fill low areas to the existing shoulder grade as specified in the contract.

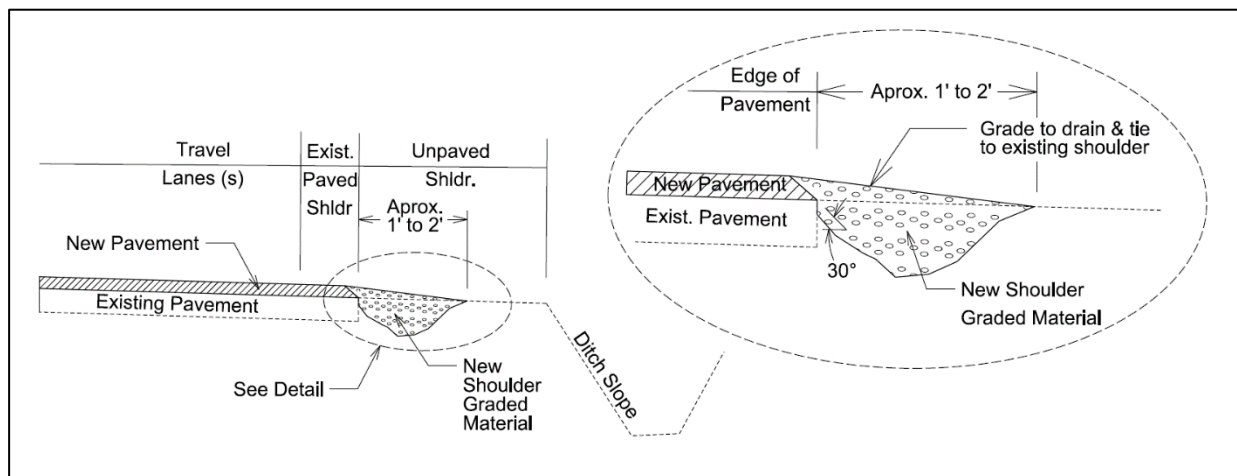


Figure 1: Wedge over Existing Pavement – Low Shoulder

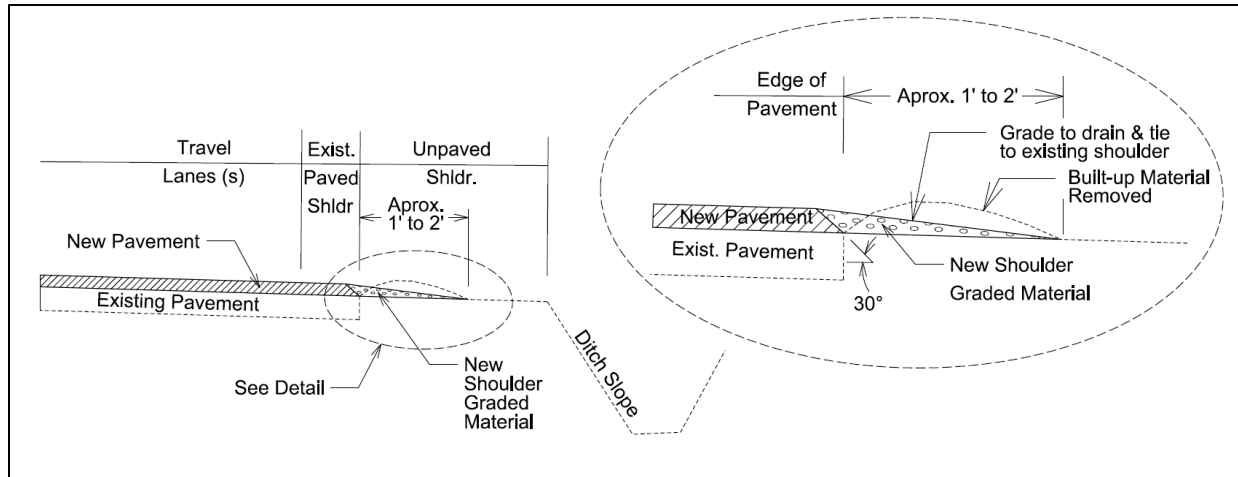


Figure 2: Wedge over Existing Pavement – High Shoulder

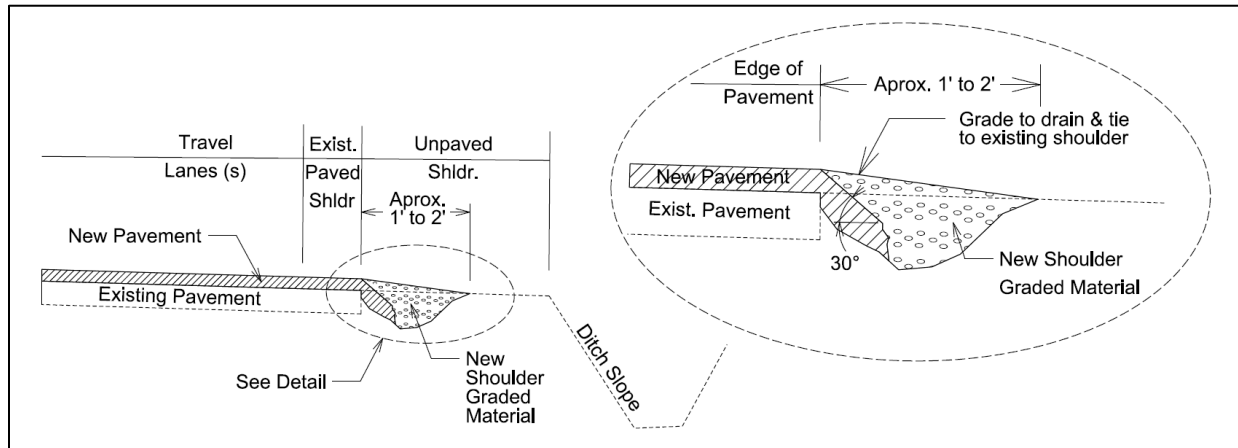


Figure 3: Wedge over Unpaved Shoulder – Low Shoulder

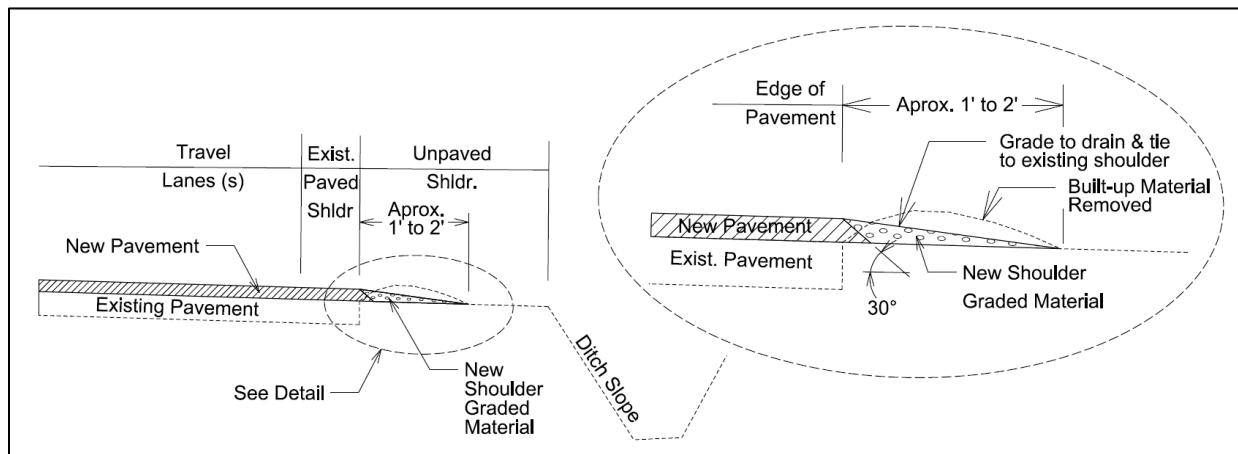


Figure 4: Wedge over Unpaved Shoulder – High Shoulder

PROCEDURES

- The 30 degree pavement wedge is measured from the pavement surface cross slope. The angle of the bevel is critical for the pavement shoulder wedge to function properly. Measured from the pavement surface cross slope extended, the bevel should be $30^{\circ} \pm 5^{\circ}$
- Paving equipment shall be adapted to furnish the 30° bevel. Contact shall be maintained between the device and the road shoulder surface and allow for transitions to cross roads, driveways and obstructions. The Contractor shall use the device to consolidate the asphalt to increase the density of the extruded profile. The Contractor may perform handwork such as transitions at driveways, intersections, interchanges, and bridges or other areas approved by the Engineer. If hard surfaced connections, such as aforementioned driveways and intersections, are separated by 20 feet or less, then the pavement wedge may be omitted between the intersections/driveways.
- For new construction or reconstruction projects, consideration should be given to widening the underlying paved layers to accommodate the wedge without decreasing the lane or shoulder widths.
- The pavement shoulder wedge may also be used when the paved shoulder width is greater than 4 feet to provide a better construction sequence/maintenance of traffic for the contractor for new construction and major rehabilitation work as directed by the Engineer. This condition should be detailed in the sequence of construction or maintenance of traffic plans prepared by the Department or its consultants.
- After paving is complete, shoulders, where specified, shall be constructed to smoothly tie the graded shoulder edge elevation to the adjoining elevation of the final pavement top surface edge or final paved or stabilized shoulder top surface edge. The shoulder shall also be graded to obtain a uniform shoulder slope to the shoulder break that conforms to the Standard Drawings.
- The Contractor shall furnish and place aggregate shoulder material, labeled as new shoulder graded material in Figures 1 to 4, where specified. The material shall be spread, graded, and compacted in accordance with Section 305.03(e) of the Specifications, except for the shaping of the subgrade which will not be required.
- The project will be subject to E&S requirements if the surrounding soil is cleared, graded or excavated, and exceeds the 2,500 or 10,000 square foot threshold for E&S. This is likely to occur in areas where high shoulders need to be cut. If the land-disturbance threshold is exceeded the Contractor shall follow the overall project SWPPP and ESC Plans and regulations as specified in the Contract Documents. The SWPPP should emphasize the Good Housekeeping requirements in the Contract Documents.

While the project can be a land-disturbing activity, the project meets the definition in the Virginia Stormwater Management Act's exemption for routine maintenance as defined under §62.1-44.15:34.C.7. Hence; there are no stormwater requirements or a need for a VSMP permit.

Measurement and Payment:

The Standard Special Provision (SP315-000320-01) for pavement shoulder wedge will guide payment for shoulder preparation and construction of the pavement shoulder wedge. For estimating purposes,

Pavement shoulder wedge, except for shoulder preparation, will not be measured for separate payment but shall be included in the cost for Asphalt Concrete. The Pavement Maintenance Management System (PMMS) has an associated Asset Description in the Advanced tab to calculate the additional quantities for the wedge shape. The quantity estimate should be

adjusted to account for additional materials on low shoulder sections that will be filled under the wedge as shown in Figure 3. .

Pavement shoulder wedge prep will be measured in linear feet along the adjacent edge of pavement and will be paid for at the contract unit price per linear foot. This price shall include grading the existing unpaved shoulder to accommodate the pavement shoulder wedge using mechanized equipment or manual methods. This price shall also include the removal and disposal of surplus, tracked, and spilled material resulting from the Contractor's operations

Aggregate material used to repair and fill low shoulders will be measured and paid for in accordance with Section 305 of the Specifications.

Pay Item	Pay Unit
Pavement shoulder wedge prep	Linear Foot